

PATENT COOPERATION TREATY

PCT

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10 MAR 2004

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <div style="text-align: center; font-family: monospace; font-size: 1.2em;">CF017559W0</div>	<div style="display: flex; justify-content: space-between;"> FOR FURTHER ACTION See Form PCT/IPEA/416 </div>	
International application No. <div style="font-family: monospace; font-size: 1.2em;">PCT/JP 03 / 11485</div>	International filing date (day/month/year) <div style="text-align: center; font-family: monospace; font-size: 1.2em;">09.09.2003</div>	Priority date (day/month/year) <div style="text-align: center; font-family: monospace; font-size: 1.2em;">19.09.2002</div>
International Patent Classification (IPC) or national classification and IPC Int.Cl. 7 C07D471/04, C09K11/06, H05B33/14, H05B33/22		
Applicant <div style="text-align: center; font-weight: bold;">CANON KABUSHIKI KAISHA</div>		

1.	This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2.	This REPORT consists of a total of <u>5</u> sheets, including this cover sheet.
3.	This report is also accompanied by ANNEXES, comprising: <div style="margin-left: 20px;"> a. <input type="checkbox"/> a total of _____ sheets, as follows: <div style="margin-left: 20px;"> <input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. </div> </div> <div style="margin-left: 20px;"> b. <input type="checkbox"/> a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions). </div>
4.	This report contains indications relating to the following items: <div style="margin-left: 20px;"> <input checked="" type="checkbox"/> Box No. I Basis of the report <input type="checkbox"/> Box No. II Priority <input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input checked="" type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI Certain documents cited <input type="checkbox"/> Box No. VII Certain defects in the international application <input type="checkbox"/> Box No. VIII Certain observations on the international application </div>

Date of submission of the demand <div style="text-align: center; font-family: monospace; font-size: 1.2em;">16.04.2004</div>	Date of completion of this report <div style="text-align: center; font-family: monospace; font-size: 1.2em;">07.12.2004</div>	
Name and mailing address of the IPEA/JP <div style="text-align: center; font-weight: bold;">Japan Patent Office</div> <div style="font-size: 0.8em;">3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan</div>	Authorized officer <div style="text-align: center; font-weight: bold;">HITOSHI WATANABE</div>	<div style="border: 1px solid black; padding: 2px; text-align: center; font-weight: bold;">4P 8213</div>
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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/JP 03 / 11485

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

- ☐ This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

- ☒ the international application as originally filed/furnished
- ☐ the description:
- pages _____ as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☐ the claims:
- pages _____ as originally filed/furnished
- pages* _____ as amended (together with any statement) under Article 19
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☐ the drawings:
- pages _____ as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (specify): _____
- ☐ any table(s) related to sequence listing (specify): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (specify): _____
- ☐ any table(s) related to sequence listing (specify): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

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Box No. IV Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
- ☒ paid additional fees.
- ☐ paid additional fees under protest.
- ☐ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is:

- ☐ complied with.
- ☒ not complied with for the following reasons:

The subject matter of Claim 1 relates to "a phenanthroline compound represented by the general formula [I]".

In general formula [I], Ar1 and Ar2 are selected from "fluorenyl group", "fluoranthenyl group", "perylene group" and "carbazolyl group". Chemical structure represented by the general formula [I] without Ar1 and Ar2 has already been known (see documents in the International Search Report) so that it may not be a significant structural element.

The present international application has four groups of inventions as follows;

1. phenanthroline compounds substituted by "fluorenyl group",
2. phenanthroline compounds substituted by "fluoranthenyl group",
3. phenanthroline compounds substituted by "perylene group" and
4. phenanthroline compounds substituted by "carbazolyl group".

4. Consequently, this report has been established in respect of the following parts of the international application:

- ☒ all parts.
- ☐ the parts relating to claims Nos. _____

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims	<u>2-15, 17, 18</u>	YES
	Claims	<u>1, 16, 19</u>	NO
Inventive step (IS)	Claims	<u>none</u>	YES
	Claims	<u>1-19</u>	NO
Industrial applicability (IA)	Claims	<u>1-19</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)**Documents**

1. EP 1097980 A2 (SONY CORPORATION) 2001.05.09, especially page 30-31, & EP 1097980 A3 & JP 2001-131174 A
2. EP 1097981 A2 (SONY CORPORATION) 2001.05.09, especially page 29-30, 4-5 & EP 1097981 A3 & JP 2001-135482 A & US 6524728 A
3. JP 2001-267080 A (TORAY INDUSTRIES, INC.) 2001.09.28, especially page 5-8 (no family)
4. ITO, Takayuki, Syntheses of Phenanthroline Derivatives and Thier Application to Organic EL Devices, Polymer Preprints, Japan, 2002.09.18, Vol.51, No.11, pages 2859-2860
5. JP 2002-050481 A (TORAY INDUSTRIES, INC.,) 2002.02.15 especially page 4-8 (no family)

Claims 1, 16 and 19 lack novelty under PCT Article 33(2) as being anticipated by document 1.

Document 1 describes the basic structures of the compounds in the inventions as well as the compounds having substituted or unsubstituted fluorenyl groups as Ar1 and Ar2.

And it also describes that the organic electroluminescent device comprising an anode electrode, a cathode electrode and an organic compound layer including bathophenanthroline compound and that the organic electroluminescent device may have a structure having a hole transport layer serving also as a luminescent element.

Claims 2-6 lack inventive steps under PCT Article 33(3) as being obvious over Document 1.

A person skilled in the art easily manufactures the various compounds base on the description of the Document 1 as above.

Claims 2, 5, 17 lack inventive steps under PCT Article 33(3) as being obvious over document 1 in view of document 2.

Document 2 describes the compounds with the basic structure of the invention having two substitutions at the ring in the middle. Document 1 describes the substituted or unsubstituted fluorenyl groups as a substitution.

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: **Box No. V**

Claims 1,2,3,13,14,15 lack inventive steps under PCT Article 33(3) as being obvious over document 3.

Document 3 describes the basic structures of the compounds in the inventions as well as the compounds having substituted or unsubstituted carbazoylyl groups.

Claims 1-12,16,17,18 lack inventive step under PCT Article 33(3) as being obvious over document 4 in view of document 5.

Document 4 describes application of phenanthroline derivatives to organic EL devices, especially application of phenanthroline substituted by naphthyl group. Document 5 describes organic EL device having tri-substituted benzen, as well as fluorenyl group, perylenyl group and fluoranthenyl group as preferred substitutions.